

THE SCOTTISH STEEL INDUSTRY

J Love and J Stevens

Introduction

Recent months have seen a reintensification of concern within Scotland over the future of steel-making at British Steel's Ravenscraig complex. This concern is intimately linked with the privatisation of British Steel (BS). For most of the 1980s BS has been charged with the responsibility of preparing the industry for privatisation and in December 1987 Kenneth Clarke, the Secretary of State at the Department of Trade and Industry, indicated that the company was to the fore of the Government's privatisation programme. Following the July 1988 announcement of a strong financial performance for the trading year 1987/88, flotation was scheduled for November 1988.

The principal purpose here is to set out the most likely consequences of this privatisation for Ravenscraig. When he announced in December 1987 the intention to privatise BS, Kenneth Clarke indicated that the company would be privatised as a single entity and made a number of references to the position of the Ravenscraig complex. Specifically he pointed out that, subject to market conditions: the hot strip mill at Ravenscraig would continue in operation at least until 1989; Ravenscraig's iron and steel-making facilities will continue to operate for at least seven years; and there will be a requirement over a similar period into the 1990s for the output of the Dalzell plate mill adjacent to the Ravenscraig complex. In July 1988 the present Chairman of BS, Mr Robert Scholey, suggested that there might be little case for the retention of the hot strip mill beyond 1989. Before turning directly to such matters, however, it is important to outline the various stages of the steel-making process and the role of Scottish output within BS's activities. This will allow an informed discussion of BS's current production configuration and facilitate an explanation of why the plant is seriously threatened by the Corporation's investment plans. The argument is that BS can reduce the number of sites at which it operates, maintain production and increase profitability. In our view, this will prove attractive to private shareholders who can increase returns through elimination of the marginal plant at Motherwell. We conclude that, given present strategies, Ravenscraig has no future within BS. We set out details of a new technique which potentially affords a future for the works. We do not share the emerging view that large plant closures can easily be accommodated. Without minimizing the difficulties, we support the view that investments

in this technique should be pressed on both BS and its future owners. In our estimation this remains the best strategy for North Lanarkshire.

The Production Processes of the Steel Industry

Steelmaking is an energy-intensive process in which iron ore is refined in a series of furnaces in order to produce a molten liquid of precise chemical composition and physical properties. The hot metal is then cast into semi-finished shapes which are rolled into a variety of final products (eg rails, rods, bars, sheets and plates). The production process presents five main stages each of which exhibit scale economies which are not exhausted by the largest plants so far constructed.

The first stage, iron-making, involves the removal of oxygen and other impurities from iron ore. In all BS plants the inputs to the process are prepared or produced on site. Coke is baked from metallurgical coal in batteries of coke-ovens and iron ore of different grades are mixed to allow the use of cheaper, less pure ores. In addition, finer grades of ore are agglomerated in a process known as sintering. A burden or charge of coke, ore and sinter is placed in the blast furnace and hot air is blown through. This causes the coke to burn, melting the ore and removing the unwanted oxygen as carbon dioxide. The molten iron is tapped into vessels and other impurities are separated off as a slag. At this stage the metal is over 90 percent pure iron and the molten liquid is transferred to a steel furnace for further refinement.

Within BS, the steelmaking stage is almost exclusively undertaken in Basic Oxygen Furnaces (BOF). The charge consists of a mixture of scrap and molten iron with small amounts of lime added to facilitate the removal of impurities. Oxygen is blown through the charge and carbon is removed as carbon monoxide gas. The process is precisely controlled to yield steel of the desired composition. It is increasingly common to further refine steel in secondary steelmaking vessels to generate higher quality output with more exacting mechanical and physical properties.

These major stages exhibit economies of scale. Aylen⁽¹⁾ estimates that the minimum efficient scale (MES) of operation of a blast furnace is 4 million tonnes per annum whilst for a BOF plant two 340 tonne vessels provide the optimum low cost unit. Capacity which is smaller results in significant cost penalties per tonne of output. BS presently operates eleven blast-furnaces, three of which are MES plants whilst only three of its five steelmaking plants approach the optimal capacity. All of BS's Scottish plant is significantly smaller than the MES and is regarded as a relatively high cost operation.

The third stage in the production process is the casting of molten steel into semi-finished shapes suitable for rolling into finished product. The

traditional method involves pouring liquid steel into moulds. The resulting ingot is allowed to cool, the mould removed and the ingot reheated and rolled in a primary mill into the desired type of "semi". This procedure has been progressively replaced by the more efficient continuous casting process which generates "semi's" directly from molten liquid. The "concast" route has three distinct benefits: it improves product yield by eliminating the scrap which results from cropping the ingot in the traditional route; it reduces energy consumption by eradicating the need to reheat inputs and power a primary mill; and the concast product is of significantly higher quality than ingot steel. By European and Japanese standards BS has been relatively slow to adopt concast, although its investment intentions in the immediate future will result in over 85 percent of its product deriving from the concast route.

The fourth stage in the process is hot rolling. Flat products such as plate and strip are rolled from semi-finished shapes called slabs whilst long products such as rails and sections are derived from blooms. A slab has a rectangular cross-section while a bloom has a square cross-section. In both cases the semi-finished feedstock is passed through a series of rollers until the desired shape is obtained. Long products are often sold to consumers with no further processing although flat products are finished in a variety of ways. Plates are often heat-treated to install the desired mechanical properties whilst hot strip can be both cold rolled to improve surface quality and coated with materials such as tin, zinc and plastic. Since the closure of the Gartcosh cold rolling mill, Scottish hot strip output requires to be transported to Wales where all of BS's finishing mills are located. Again, scale economies exist in rolling mills and Aylen⁽²⁾ estimates that only BS's two Welsh strip mills approach the optimal scale. In addition, both of BS's remaining plate mills at Dalzell and Scunthorpe are small and under-powered and present cost penalties compared with larger units.

In Scotland Ravenscraig produces slabs and hot strip. Both of these are intermediate products which require further processing. Dalzell produces plates of high quality and tolerances, eg armour plates, submarine hulls, plates for construction of high pressure boilers and plates for offshore applications. At present, as may be seen from Table 1, 20 percent of Ravenscraig's output goes to Dalzell. Around 35 percent of Ravenscraig's

TABLE 1
Current Disposition of Ravenscraig's Output (000 tonnes)

Export Slabs	300
Dalzell	400
Shotton	700
Tinplate	400
HRC Exports	<u>200</u>
Total Output	<u>2000</u>

output goes to Shotton, its single most important consumer, for further processing. Remaining output is disposed as exports slabs (15 percent), tinplate (20 percent) and hot rolled coil exports (10 percent).

The Evolution of BS's Productive Capacity

Following nationalization in 1967, the Steel Corporation operated all the major production processes at twenty-one sites. In addition to those integrated plants, the Corporation engaged in steelmaking at sixteen other locations, twelve of which possessed rolling mills. Rolling and finishing were undertaken at a further dozen locations. Much of this capacity employed obsolete production methods and was extremely small scale relative to the optimal plant size for the respective technology.

Following the Benson Report, it was widely believed that, because of scale economies, the UK industry required to concentrate production at a small number of large scale plants. Indeed, nationalization was regarded in many quarters as a necessary step to attaining this objective because the segmented ownership and poor performance of the private sector acted as a constraint upon the adjustment process. The model for the industry was the large scale coastal sites in Japan. A corporate strategy was thrashed out by BS executives, steel consultants and civil servants which envisaged that the Corporation would have 36 million tonnes of liquid steelmaking capacity by the early 1980s concentrated at five or six major plants all at coastal locations. This plan was fully set out in the Ten Year Development Strategy published by Government in 1973.

In the first instance, major investments were to be undertaken at the two Welsh strip plants at Port Talbot and Llanwern in South Wales, and at the long product sites at Redcar and Scunthorpe. The programme anticipated major increases in capacity at these plants which would be utilized fully through closure and withdrawal from sub-optimal locations. In Scotland the situation was a little different. Ravenscraig was to be expanded marginally and completely modernized with improvements made at all stages of the production process. However, it remained a smaller plant than the English and Welsh operations because it was regarded as a staging post for a 6-7 million tonnes per annum plant at Hunterston based on the Direct Reduction-Electric Arc steelmaking route.

The first Opec oil shock depressed the world economy in the mid 1970s. Steelmakers were simultaneously faced with falling demand, rising input prices and higher cost of capital. The Corporation's costs in this period rose particularly sharply because they were prevented from closing many of their smaller plants for social reasons. Market conditions continued to deteriorate as much of the Corporation's modern capacity came on stream and world-wide capacity rose as a result of expansion plans in Less Developed Countries (LDC's) and other countries. In 1979, BS

were forced to retrench further by closing relatively modern works as at Consett, Shotton and Corby. The strategy became one of loading up their five Heritage plants and thereby attempting to reduce average costs. In addition, they embarked on Project Slimline which involved major changes in working practices and remuneration. Surviving works were eventually to be demanned in order to increase labour productivity whilst a greater element of earnings was in the form of a lump sum bonus linked to performance.

As early as 1980, however, following the second Opec oil shock, the Corporation were considering still further rationalization. The 1980/81 Corporate plan, projected likely demand and concluded that on the basis of pessimistic scenarios, savings could be made only by further concentration of activity. It is interesting to note that, given the total upgrading of Ravenscraig which took place during the 1970s, the option of closing the complex was not at the centre of the Corporation's thinking. The most likely option for strip products appeared to be mothballing of Llanwern's steelmaking and Port Talbot's rolling mills. In the event these options were not pursued in Wales but the position of the Scottish industry altered dramatically during the 1980s.

The shift in attitude towards Ravenscraig emerged from two sets of considerations: first, against a background of considerable world-wide excess steel capacity, the Corporation foresaw substantial difficulties in securing good margin business in highly competitive non-EEC markets and was constrained within Europe by adverse currency levels and by the Davignon quota arrangements designed to restore balance between European output and demand; secondly, the Corporation's strategic thinking shifted towards identification of Ravenscraig as the marginal plant among the five remaining integrated steelworks. This latter consideration was based essentially on a comparison between the attributes of the Corporation's operations in Scotland and in South Wales.

Locational and site-specific factors played a central role in determining the Corporation's outlook. Located inland from the ore terminal at Hunterston, Ravenscraig clearly did not, unlike Port Talbot, fit the "ideal" model of a coastal plant. Port Talbot's larger plant also presented the potential for the realisation of scale economies. Llanwern had the advantage over Ravenscraig of a well laid out site. Perhaps the most widely-discussed rationale for regarding Ravenscraig as the marginal plant lay, however, in the observation that Ravenscraig was more remote than the Welsh plants from final consumers. The decline of metal-using industries in Scotland imposed a cost disadvantage relative to the plants in terms of the higher transport costs involved in marketing Ravenscraig's output.

Concern that the shift in attitude towards Ravenscraig would result in attempts by Sir Ian MacGregor to close the plant precipitated a campaign of

resistance within Scotland. This campaign was based on social and regional considerations and on the argument advanced primarily by Strathclyde Regional Council, that the Corporation was incorrect in its assessment that likely steel demand was inefficient to sustain five integrated plants. These efforts had a particularly successful conclusion. In 1982, following strong Scottish Office pressure, the Department of Trade and Industry prevented BS from commencing upon closure moves.

Thereafter, perhaps partly for tactical (political) reasons and partly because of some increase in UK steel consumption during 1983-84, the Corporation shifted away from seeking a complete and abrupt closure of an integrated plant and towards the idea of a phased contraction. In 1984, the then Corporation Chairman, Sir Robert Haslam, discussed the closure of an integrated plant in frank terms by indicating to the Trade and Industry Select Committee that:

"Our view would be that any closure would be phased and hence an immediate closure would be unlikely"(Cmnd 344 p.57).

The subsequent closure of the Gartcosh cold-rolling mill in 1986 should be viewed as representing one of those phases. That closure was consistent with the Corporation's oft-repeated argument that the objectives of commercial viability and privatisation are inconsistent with a five-plant configuration. Announcement of the Gartcosh closure made the Corporation eligible for State aid as part of the Community's capacity reduction and restructuring provisions. Simultaneously, the Corporation purchased and closed the privately-owned company Alphasteel and set about refurbishing Alphasteel's continuous casting facilities for installation at Llanwern as part of a massive programme of upgrading the Welsh plants.

Two important elements emerged from the Gartcosh closure. First, with the explicit support of Government Ministers, social and regional considerations were firmly relegated to a minor role with the Corporation's thinking being driven primarily by the need to enhance commercial viability. Secondly, the locational savings derived from closing Gartcosh were minimal suggesting that the bulk of costs continued to rest with the main Ravenscraigh complex.

British Steel: The Current Situation

British Steel faces a difficult environment because of adverse long run trends in world capacity. In particular, it is faced with excess capacity for key products in its home market in Europe. This has prompted BS Chairman, Sir Robert Scholey, to openly speculate as to whether the company will require only three integrated plants by the mid 1990s.

LDC's share of steel production continues to grow faster than real

consumption. Much of this is state-owned and constitutes a key element in overall development strategies. There is continuing protection of major markets, notably the EEC and USA. The net effect of this has been to restrict access to profitable US and EEC business for many steelmakers. Production has been diverted to third markets causing prices to be weak. In addition, European producers have found their restricted access to US markets progressively less lucrative in recent years owing to the strength of European currencies against the dollar. This is partially offset by lower domestic prices for essential inputs such as coal, oil and ore which are denominated in dollars. Because Continental producers export greater proportions of production to North America than BS, their profitability has been restricted to a more significant extent. However, BS, which exports 40% percent of its finished product has great difficulty finding good margin business in non-EEC markets. Until the uncertainty surrounding the dollar is settled and until the US protective regime is dismantled, it is likely that the EEC will remain the only market where BS can consistently generate reasonable margins on its export volumes.

In the Community the apparatus constructed following the declaration of manifest crisis in 1980 has been dismantled for most major products. After failure to generate voluntary capacity reductions, the Commission liberalized the strip products market in July 1987. Thus, the situation in Europe is now one of a free market in which operating subsidies and investment aid are strictly prohibited. Since the mid-1970s, BS has progressively increased the share of its turnover derived from Community markets. In recent years, the weakness of the pound against the key currency, the Deutschmark (DM) has significantly enhanced the Corporation's profitability. Recent City estimates suggest that a 5 percent adverse movement of Sterling against the Mark will lead to a £120m reduction in BS profits.

In addition to this currency advantage, BS has emerged as the world's lowest cost steel producer. This is the direct result of rationalization of capacity, investment programmes and manpower policies of the early 1980s. At present BS is one of the Community's few profitable steel producers and one would be tempted to conclude that BS's European market share will inevitably increase further through the ability to undercut the prices of EEC rivals thus contributing to the enforced exit of loss-making firms. However, three constraints can be identified which will limit such advances. First, the distribution channels on the continent are dominated by the producers. In France and Germany, 56 percent and 75 percent of stockholding activity is controlled by steelmakers. This contrasts with the UK situation where the British Steel Service Centres account for less than 20 percent of the stockholding market. In recent years, BS has sought to remedy this position through acquisition of Continental stockists and re-rollers and would not be adverse to acquiring a European steelmaker to further enhance market access. Secondly, there is a

considerable degree of state involvement in the affairs of Community steelmakers. In both France and Italy, the steel industry is state-owned whilst the Dutch hold a golden share in Hoogovens. In Germany, the financial institutions own and control both steelmakers and major steel consumers. These factors restrict the ability of BS to expand in Europe through acquisition. Thirdly, because of the size of modern steel plants, they are often dominant employers in local economies. Indeed, since 1986, the EEC has been engaged in supra national negotiations designed to effect capacity reductions. The failure to achieve these aims largely reflects the reluctance of Government to face the social and political consequences of steel closures.

The ability of BS to capitalize on its cost and currency advantages is, thus, limited and the elimination of unprofitable excess capacity is likely to be slow. As Aylen⁽³⁾ has pointed out, the immediate tactics are likely to involve joint production arrangements rather than merger and acquisition. Whilst such actions will contribute towards eliminating excess supply, contraction has to be negotiated which implies a less favourable outcome for BS than that which would emerge if the market for corporate control was more competitive. Therefore, although BS can look forward to a successful future in Europe, uncertainty concerning excess capacity and currency levels allied to the bleak outlook in third markets prompts senior executives to question both whether present high production levels will endure and whether activity at all five integrated plants can be profitably sustained.

On top of this long run contractionary pressure there are more immediate reasons to suspect that BS will withdraw from one or more of its present locations. First, all major forecasting agencies are predicting downturns in steel production in the first part of the next decade. Indeed, BS's own stockbroker, Philips and Drew has recently estimated that world steel demand will decline by 5 percent in 1990 and will not again reach current levels until the middle of the decade. In this analysis, EEC demand fares slightly better and it should be appreciated that BS is relatively well placed to weather a downturn in the cycle. However, such considerations rightly provoke concern about the marginal plant at Motherwell reinforced by the conclusions of the review of the Scottish steel industry undertaken for Motherwell District Council by Arthur Young.⁽⁴⁾ This study draws attention to the plant configuration within BS and re-emphasizes the fact that, at all integrated sites, the Corporation's has iron and steelmaking capacity in excess of its casting and rolling capacity.

The exact situation has been fully set out in the papers submitted to Arthur Young by Dunbar and Associates, the steel consultants led by Jimmy Dunbar, the former Works Director at Ravenscraig. This analysis demonstrates that both Port Talbot and Ravenscraig are constrained by concast bottlenecks and that both have iron and steelmaking capacity which

cannot be fully utilized. At Redcar, there is insufficient iron making capacity to fully utilize the downstream production capacity. Both Llanwern and Scunthorpe could increase output by bringing onstream idle blast furnaces. However, Llanwern is constrained by having a large proportion of its throughput processed by the ingot casting route. This not only results in cost penalties but generates output which is increasingly difficult to market profitably because of quality considerations. At Scunthorpe, the considerable iron and steelmaking facilities cannot be fully utilized because of both insufficient rolling mill capacity, a concast bottleneck and a low level of demand for the product range.

It should be appreciated that these bottlenecks effectively arise owing to the haphazard retreat from the scale of operation envisaged by the 1973 Development Strategy. The constraints, if removed, would allow a higher scale of activity and consequent reduction of average costs. The Arthur Young report made particular reference to the situation existing in BS's Strip Product Division and the plate making configuration evident within General Steels. The study basically concludes that it would be possible to eliminate the requirement for Ravenscraig's output by removing constraints at the two Welsh plants. This would mean no net loss of production potential and would lead to an annual increase in profitability of £100m at current levels of activity.

As indicated earlier, BS require to rationalise their plate making activity. It is possible that such a development could take place in Scotland although it would be costly to undertake this expansion at Motherwell. Given the situation at Scunthorpe, Arthur Young and most other analysts argue that BS's most profitable course is to proceed with any proposed single plate mill development at this site. However, such conclusions should not prevent the Scottish Lobby from pressing BS on this matter. The timing of plate mill rationalization, like the timescale of retreat from Motherwell, is uncertain. Although the Arthur Young study provides a timetable, its critics should note that this is illustrative rather than definitive.

EEC stipulations dictate that investment expenditure must be financed from commercial borrowing or cash flow. Thus the timing of all such output enhancing and cost reducing expenditures depends on the level of profitability which governs both possibilities. This in turn is a function of the market conditions which BS will face over the coming period. Indeed Bell et al⁽⁵⁾ have surveyed major Scottish plate consumers and conclude that the likely level of North Sea activity will contribute to a continued buoyant demand for Dalzell plate. Given that Dalzell presents locational advantages with respect to many of its customers, this suggests that its future is indeed secure until well into the next decade. However, this study affords no conclusions and thus no comfort for the HSM whose closure BS estimate would save £15m per annum in operating costs.

The only possible conclusion from this analysis is that Ravenscraig faces a serious threat to its survival. This emanates from the external environment and the internal configuration of capacity. Thus, although it is demonstrably profitable, given current conditions, to operate on the basis of five integrated plants, it is more profitable to reduce the number of sites. In addition, because of the capacity enhancing nature of certain investment expenditure, this will not necessarily lead to the adverse effects on trade alluded to in certain quarters.

The Effects of Privatisation

Privatisation can be viewed to consist of two elements, the transfer of ownership and the liberalization of product and capital markets for the business in question. As has been pointed out above, the latter is not within the UK Government's control given that BS's home market should be properly regarded as the EEC block. Thus privatisation of BS, whilst it may lead to a more credible platform from which to urge removal of the barriers to rationalization within the Community, is merely a transference of ownership from state to private individuals, employees and financial institutions. The Government has retained a golden share which previous experience suggests will be used sparingly, if at all.

Our view, expressed over the last two years in the *Fraser Institute Quarterly Commentary*, is that an early flotation would seriously undermine the security of the Ravenscraig plant. The optimal outcome for Scottish interests would have been for the present owners, the State, to instruct BS management to prepare for flotation on the basis that they are required to build up profitable activity to a level which secures the future of the Motherwell plant. The guarantees given by BS and Trade Ministers fall far short of this. Indeed, recent statements by Sir Robert Scholey give further credence to the Arthur Young analysis. It would not be unfair to suggest that the Arthur Young scenario is that favoured by senior BS executives and that early flotation will be viewed by them as legitimization of this strategy.

Indeed, the guarantees provided by BS and Government for the Motherwell Works should be assessed rather carefully. During the process of preparing for flotation, a company requires to provide much information in order to allow investors to gauge future direction and calculate a market price with which to compare with the offer for sale. The bulk of this information can be provided to analysts via company visits, published reports and accounts and special documentation. Steel is historically a cyclical industry and one important signal which requires to be made is how management will react to declining earnings during a downturn. In this respect the Motherwell guarantees demonstrate that a feasible retrenchment strategy is available to offer some support to bottom line profits if the trading environment does deteriorate as certain major

forecasters expect. In this view, the guarantees are directed towards comforting financial institutions rather than Lanarkshire workers. This is because the guarantees signal the likely timescale required for locational contraction whilst minimising the disruption to steel consumers. The qualification that the guarantees are subject to market considerations provides considerable flexibility and in the final analysis give BS *carte blanche* to dispose of their Scottish operation as they see fit.

In numerous press interviews, Sir Robert Scholey has forcibly spelt out that he intends to be a profit maximizer as opposed to an output maximizer. He has publicly welcomed the privatisation as a measure which facilitates a thorough review of site policy because it frees management to make decisions on commercial grounds without the need to heed wider political pressure. He is signalling to potential shareholders that his leadership will be robust in defence of the interests of the new owners. The bullish stance over the future of the Ravenscraig strip mill is part of this process. Given the benefits of contraction identified by Arthur Young, Scholey is giving every indication that he will sacrifice his Scottish capacity, if and when it is in the best interests of his shareholders to do so.

Scottish Steel – The Way Ahead

There is every indication that phased withdrawal from Motherwell is the scenario most likely to unfold over the next five years. The timing of each phase will depend on the commercial judgement of BS. However, abstracting from the evolution of the trading environment, there is an internal dynamic within the Corporation which appears loaded against the Motherwell plant. The STUC⁽⁶⁾ has recently identified and costed the investment expenditure essential to maintain the efficiency and competitiveness of the works. This involves £24m to stabilize the medium term coke supply, £18m for a modern reheating furnace and £20-£25 million for various process improvements at the strip mill. The latter expenditure would improve the quality and range of output as well as improving the efficiency of the production process. Given the recent decision to "debottleneck" Port Talbot, it is unlikely that any of these claims will be entertained when the Strip Product Group reviews its operations in 1989. As Love and Stevens⁽⁷⁾ conclude, there is a strong chance that the strip mill will not survive this appraisal and there is a high probability that the plant will be closed as soon as substitute capacity is brought on line. This could be two to three years ahead.

If the strip mill closes within this timescale, Ravenscraig's immediate major role will be one of supplying high quality slab for internal purposes. In the short run there could be considerable volumes despatched to South Wales to facilitate the debottlenecking of the two plants with minimum disruption. As indicated earlier the demand from the Dalzell plate mill seems secure until the mid 1990s. However, as investment increases the

capacity of all four integrated plants and some resolution of the plate sector is undertaken, these internal markets will decline sharply.

The annual capacity of Ravenscraig's two concast machines is approximately 2.2m tonnes. Assuming a continuing delivery of 500,000 tonnes of slabs to Dalzell, this implies that by the early 1990's, BS will require to market 1.7 million tonnes of slabs externally. In 1987 the UK steel industry exported 1.5 million tonnes of semis (ie ingots, blooms, billets and slab). At present Ravenscraig slab exports total 350m tonnes pa. It is true to say that there is an emerging market for high quality slab but in all non-EEC markets the average realized sterling value of semi-finished export is low. This is particularly true of North American markets where approximately one third of such exports are placed. Fortunately, the dollar, whilst volatile, has recently moved favourably against the pound, but future access to this market depends on decisions to be taken in 1989 when import volumes will be determined for EEC producers.

Ravenscraig's advantage in export markets derives from its adoption of concast and secondary steelmaking and present favourable currency levels. Because of scale and locational considerations, it is likely to be relatively high cost output. A supply of such products to both US and EEC markets would clearly facilitate modernization and rationalization at inefficient sites. The most secure arrangement would be similar to the medium term contracts proposed and occasionally secured with US producers. In the short-term such ventures may prove possible within Europe although the difficulties of finding partners free and willing to sacrifice capacity to absorb Ravenscraig's slab output should not be understated. Thus it is not at all clear that a viable medium term slabmaking role exists for the Scottish Plant.

In addition to the question marks over the commercial attractiveness of slab markets, the issue of coke supply needs to be addressed. It is not apparent that BS will find it attractive to commit funds to perpetuate a small scale facility producing a low value added product. In our view given that market considerations do not pre-empt matters, the slab making role will not endure past the point when significant investment expenditure becomes essential.

It is apparent that a new role requires to be found to justify Ravenscraig beyond the mid 1990's. During the debates and committee stage of the British Steel Bill, Dr Jeremy Bray repeatedly drew attention to the direction of developments in casting technology. A new generation of casting machines is becoming available which generates thin slabs which require less processing at the rolling stage. Indeed this "thin slab casting" process effectively dispenses with the need to operate wide-hot strip mills. This new technique is less capital intensive and promises significant savings in energy consumption per tonne of final product. Adoption significantly

reduces the MES of an integrated strip mill and in the US is set to provoke competition between the large BOF plants and the Electric Arc minimills in strip product markets.

In addition, the development and adoption of direct smelting over the next 20 to 30 years threatens to eclipse the dominance of the BF-BOF steelmaking route. This process refines iron ore to steel quality in one furnace and promises considerable savings in both capital costs and energy consumption. BS is currently constructing a pilot plant in conjunction with Dutch steelmaker Hoogovens. If technically and commercially sound, this process threatens to provide lower entry costs and yield output competitive with that of large scale BF-BOF operations.

In Europe, such developments could significantly undermine Aylen's conclusions concerning the inevitability of growing concentration in European steel markets. In this view,

"It is evident that two minimum efficient scale plants (rather than five) would be ideal for supplying all the UK's heavier products coupled with, perhaps, two mini-steelworks (there are two at present). Comparable restructuring could be anticipated in Western Europe, where an obvious solution is for heavy product manufacture to gravitate towards a few well chosen coastal sites, with finishing facilities – which exhibit fewer economies of scale – located closer to mid-European markets. This implies that large swathes of the French, Belgian, Luxemburg and West German steel industries would close, as coastal sites in Holland, the UK and perhaps France and Italy are rounded out to nearer optimum capacity."⁽⁸⁾

This view that a small number of very large plants will come to dominate European production ignores the possible impact of revolutionary process innovations. Another likely long run trend is the closure of BF-BOS plants in the face of competition from smaller, better located and more flexible producers operating efficient mini mills. However, over the coming period the slow trend identified by Aylen is likely to dominate. The larger and better situated steelplants will continue to be upgraded and enlarged. As outlined above, this process has already started in the UK.

Recent Annual Reports indicate that BS has undertaken considerable research into thin slab casting. Love and Stevens⁽⁹⁾ have pointed out that BS feels under little pressure to adopt this technology quickly because it possesses two large scale modern stripmills in South Wales which it can upgrade and expand. In the coming period, thin slab casting will become mandatory for competitive stripmaking and there is considerable merit in Bray's view that BS should install this process at Motherwell in order to gain operational experience and to develop the scope of the process. The

threat of thin slab casting is imminent. As Bray has argued,

“Port Talbot and Llanwern may well be the last of the old style hot mills in Europe to be modernized. It would not be the first time that British Steel has been the last to invest in an obsolescent technology.”⁽¹⁰⁾

BS does not intend to diversify into non steel activity as many American, Japanese and European producers have done. This suggests that leading roles in new process innovations are essential if the business is to flourish. With expertise in both thin slab casting and direct smelting, BS would reduce the risk of being left behind towards the end of the next decade and in the first part of the next century. Such advantage will not materialise without undertaking the development work now. If this is done, BS shareholders can look forward to a competitive business in a strong position to engage in multinational expansion both in Europe and further afield.

Thus, a sustained campaign amongst BS's institutional shareholders must be undertaken to stress the importance of dynamic efficiency to an undiversified steelmaker. The case for the adoption and development of thin slab casting at Motherwell could be a major plank in this effort. As Bray⁽¹¹⁾ concedes, this technology can only be introduced on that site if the strip mill were closed and dismantled. This will present a job loss of over 700 direct employees plus additional losses through knock on effects. This has the advantage of making the remaining 2,500 jobs marginally more secure and promises rehires as the new casters and mill come onstream. This is progressive argument to put to BS during the strip products review in 1989 and can be argued alongside retention and investment in the HSM.

The attractiveness of either option depends on the immediate and expected outlook for strip demand. However, installing a new caster will remove a bottleneck and could lead to lower average costs at the iron and steelmaking stages. The timing of adoption could be left until market conditions permit. Thin slab casting affords cost savings which would offset the cost penalties inherent in a Scottish inland location. In the mid 1990's, Ravenscraig could find itself in the same position as during the early 1980's when technical advantage sustained the works in the face of severe locational disadvantage. This scenario may be difficult to sell to BS because it would ultimately provide capacity over and above that generated by removing production constraints in South Wales.

However, BS is known to be actively seeking European partners through either acquisition or joint venture. Any deal could be made significantly more attractive if the promise of involvement in new processes is part of the package. Thus, the Bray strategy not only makes long run sense but could facilitate the company's short run expansionist policy. Such

implications should also be drawn to the attention of City institutions who are collectively noted for short termism. The pitfalls in this approach should not be minimised. BS may be inclined to promote scepticism or could attempt to pre-empt the discussions by admitting the general merits of the case and by announcing installation of thin slab casting at another site.

New technology provides a measure of credibility to notions that Ravenscraig could survive outwith BS as part of an overseas concern or even as an independent entity. The major difficulty with such proposals is that they present BS with competition in its UK markets from a UK location. It is unlikely that BS will look upon any such prospect favourably, in any case, there is no short term likelihood that BS will wish to sell the plant because, at present, they foresee a need for it's slab output. However, if the capacity issue is resolved in the way outlined by Arthur Young, then there may come a time when the works is genuinely surplus to requirements. An agreement with Government compels BS to offer the facility for sale at this point. It is highly likely that any such offer would be given only at a time of difficulty in steel markets. In addition, BS seem set to operate Ravenscraig with minimal investment expenditure thus reducing the attractiveness of the plant to potential buyers. Thin slab casting would offer future owners a low cost route into strip markets from a relatively high cost location. However finishing mills would be required to further process the strip for final customers. An independent Scottish operator would either have to construct these at suitable sites or link up with continental facilities. The former presents substantial capital costs above the purchase price and any sums required to modernize the capacity. The latter raises the question of whether partners could be found willing to close domestic steelmaking capacity in order to absorb Scottish output. Such an arrangement is not impossible to contemplate but does involve considerable suspension of judgement.

Although thin slab casting offers some hope of a future for Ravenscraig outwith British Steel, there are risks that it will not be a commercially sound step for anyone at a time when BS were prepared to part with the capacity. It would be less risky for Scottish interests if BS were persuaded to undertake this investment. They would be better placed to market the product and have knowledge of both the works and the new casting process. It should be appreciated that such an option would merely prolong the life of the existing iron and steelmaking operation and thus extend the timescale available in which to plan and execute policies to minimize the social and economic effects of steel retreat from North Lanarkshire. However there is nothing to be lost in a strategy which seeks to buy time.

Conclusion

Two scenarios concerning the future industrial structure of the steel

industry have been presented in this paper. The first, that of Aylen and BS itself, sees the emergence of a smaller number of large, well laid out and situated plants supplying a progressively declining demand for bulk steel products. The second, that of Love & Stevens and Bray, sees new technology affording the possibility of entry by smaller, competitive suppliers threatening the markets and scale economies required by the large BOS-BOF plants. It should be appreciated that it is difficult to advance Scotland as an optimal location in either case.

The existence of an option which affords BS the opportunity of increasing profitability and maintaining volume via locational withdrawal is one which will be exercised sooner or later.

Privatisation significantly increases the probability of early implementation. Indeed, there is strong evidence that this course is currently being pursued and that BS management will shortly commend further stages to the new owners. This involves depressed earnings in the short run because of exceptional items such as redundancy costs and site closure costs. The benefit is a future stream of higher profits and thus a stronger equity price. To smooth out the impact on profits a phased withdrawal from Motherwell is likely in the manner set out by Arthur Young. The bulk of the total costs will fall on the community whose institutions will require to commit substantial resources towards repairing the social and economic damage which will inevitably result.

Baur⁽¹²⁾ has argued persuasively that Ravenscraig assumes a significance in Scottish public affairs not justified by its role and status in the Scottish economy. This is certainly correct. However there are three recent studies of the economic impact of closure. Arthur Young⁽¹³⁾ and Bell et al⁽¹⁴⁾ estimate that 11-12,000 jobs will ultimately be lost whilst Pidd⁽¹⁵⁾ forecasts a loss of 9,550 jobs and a reduction in Scottish GDP of £100m pa. Part of the discrepancy in estimates is accounted for by the exclusion of Dalzell in the latter analysis. All three reports are unanimous that the vast bulk of the impact would fall on the Lanarkshire economy. Baur advances the view that the Scottish Office believe that an orderly provision of alternative employment can be organized following a gradual withdrawal from steelmaking activity. Indeed this stance has been taken by Ministers in the face of several recent closure announcements, notably that at the Royal Ordnance Factory (ROF) at Bishopton. There has also been much Ministerial reference to 'success' in other steel closure areas with the experience of the Garnock Valley to the fore in such accounts.

These arguments should be approached with extreme caution. The loss of large numbers of relatively well paid manual and semi-skilled jobs in the traditional industries in the 1970's and 1980's has left its toll in Central Scotland. In the Garnock Valley, a small business development programme was initiated in 1979 following the closure of the majority of

Glengarnock Steelworks. Significant environmental work and provision of advance factories were undertaken to facilitate the creation of small and medium size industrial concerns. It is true to say that a significant number of jobs have been assisted but many employ a predominantly female workforce and most are characterized by low skill profiles and poor wage rates. This experience is mirrored across the Central Belt where many of the old industrial communities afford the choice of either no work or work in marginal employment at low wages.

Although a proper evaluation of the labour market experience of Glengarnock's steelworkers has not been undertaken, it is true to say that few ended up in the new enterprises set up in the Garnock Valley. However their offspring have and can be viewed to be stuck in a low skill-low wage trap. The main community concerned, Kilbirnie, lost both coherence and morale and is only now slowly recovering. Significant deprivation exists which will get worse as the pension income of former industrial employees declines. Indeed, there are few of the new jobs with adequate pension schemes or prospects for advancement. The Garnock Valley lost an opportunity structure which held out some prospects for economic advancement from a low human capital base and this has not been replaced. This is the picture which exists across Central Scotland in the face of the decline of core industries.

The state of industrial policy in Scotland is such that, on the back of growing skill shortages, the Scottish CBI have negotiated a new approach directly with the Prime Minister. The experience of the past decade should persuade one that a small business policy will create a high proportion of marginal jobs at low wages. The bulk of the returns appear to accrue to the entrepreneurs, especially in Scotland where high unemployment constrains the ability of labour to pre-empt a larger share of any rents which result from the firms activity. A complementary training initiative is likely to confer benefits on the labourforce itself. It would go some way to providing an equitable solution for those disadvantaged because they happened to come onto the labour market in the early 1980's. Indeed the experience of recent school leavers is not markedly better. To day, the vast majority of Scots displaced from traditional industry and their children, who have been largely brought up to follow suit, have been unable to share in the benefits offered by the Enterprize Culture. It is to be hoped that the 'Hughes Plan' leads to opportunities for the unemployed in peripheral estates and depressed communities and those in marginal employment to acquire marketable skills on which to base careers and plan futures.

Whatever the outcome of these deliberations, if arguments based on new technology fail to impress British Steel, then urgent consideration must be given to major economic initiatives in North Lanarkshire. Indeed, it is arguable that greater resources should be concentrated in this area in any case because it is part of the economy with manifest difficulties.

Ancillary measures such as the upgrading of the A74 and the provision of fast rail links between the North and the Channel Tunnel would clearly enhance the attractiveness of the area for industrial and commercial development. In addition, further civil service dispersal is being sought and Lanarkshire should be considered for such projects. The notion that new SDA initiatives in North Lanarkshire undermine and betray the steel industry is palpable nonsense. Following privatisation, decisions on steel are wholly independent of the economic and social conditions in the area. Lanarkshire has nothing to lose from demanding greater resources and those who criticize such measures are flying in the face of common sense. Any offers of major expenditure should be universally applauded rather than treated with suspicion.

However, such initiatives should not be represented in any attempt to understate the severe and painful adjustments which would result as a consequence of steel closure. New economic activity would result in a pattern of labour demand markedly different from that which prevails in the steel industry and those closely linked sectors which would contract in tandem. Thus, even if there were tangible evidence of major and properly resourced business development and training programmes in Scotland, it would be imprudent to give up 11,000 jobs in an already depressed economy without first exhausting every commercial possibility for their retention.

Jim Love, Department of Economics, University of Strathclyde.
Jim Stevens, Department of Economics, University of Strathclyde.

References

1. Aylen, Jonathon, "The Privatization of the British Steel Corporation", *Fiscal Studies*, Vol.9, No.3, August 1988.
2. *Ibid.*
3. *Ibid.*
4. Young, Arthur, "A Study of the Impact of Privatization of British Steel Corporation on the Future of Ravenscraig and Dalzell Steel Works", Motherwell District Council, February 1988.
5. Bell, D, Findlay, J, Oughton, C, "The Importance of the Steel Industry to the Scottish Economy", Scottish Steel Campaign Trust, March 1988.
6. STUC, "Privatization and the Scottish Steel Industry", STUC, September 1987.

7. Love, J and Stevens, J. "RSD: A Comment", *Fraser of Allander Institute Quarterly Economic Commentary*, Vol.13, No.4, June 1988.
8. Aylen, *op.cit.* p.15.
9. Love and Stevens, *op. cit.*
10. Bray, J. "The City should make sure British Steel's strengths are built on", *Financial Times*, 19th October 1988.
11. *Ibid.*
12. Baur, C. "Long Shadow Hangs Over Ravenscraig", *Scotland on Sunday*, 16th October 1988.
13. Young, *op. cit.*
14. Bell et al, *op. cit.*
15. PIEDA, "BSC Ravenscraig Works: Economic Impacts of Closure", Scottish Television Ltd, December 1987.